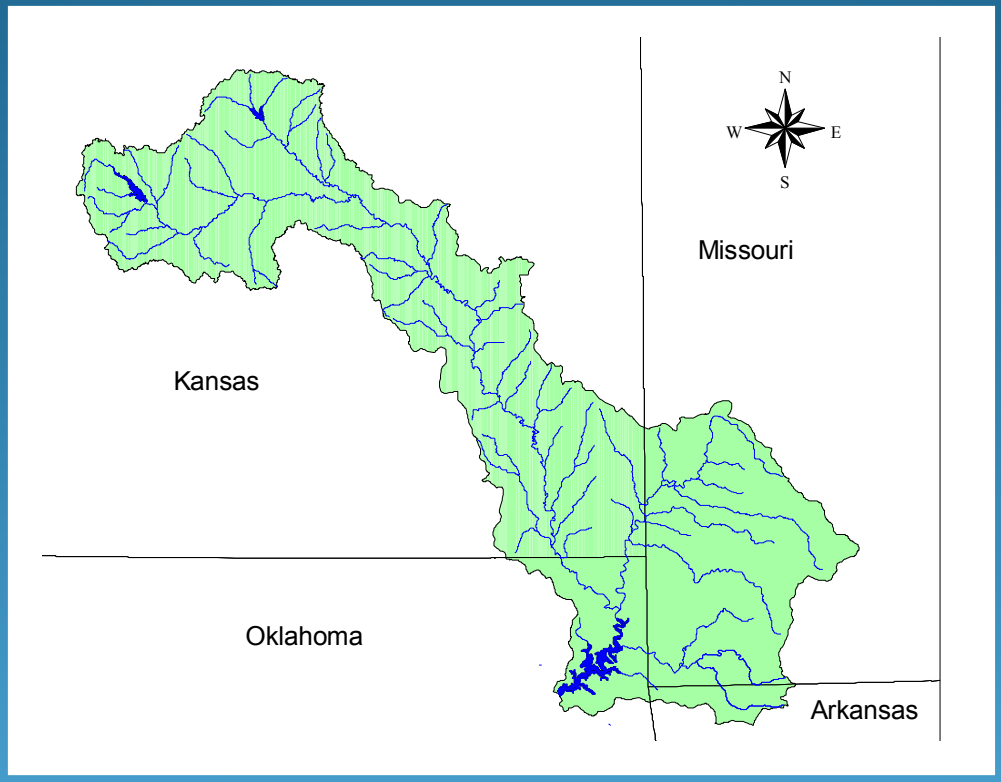
An Interstate Watershed Perspective



James Triplett, Pittsburg State University (speaker)
Kevin Gustavson, Oklahoma Conservation Commission

Presented at the Spring River Water Summit in Joplin, MO on 5/30/2013

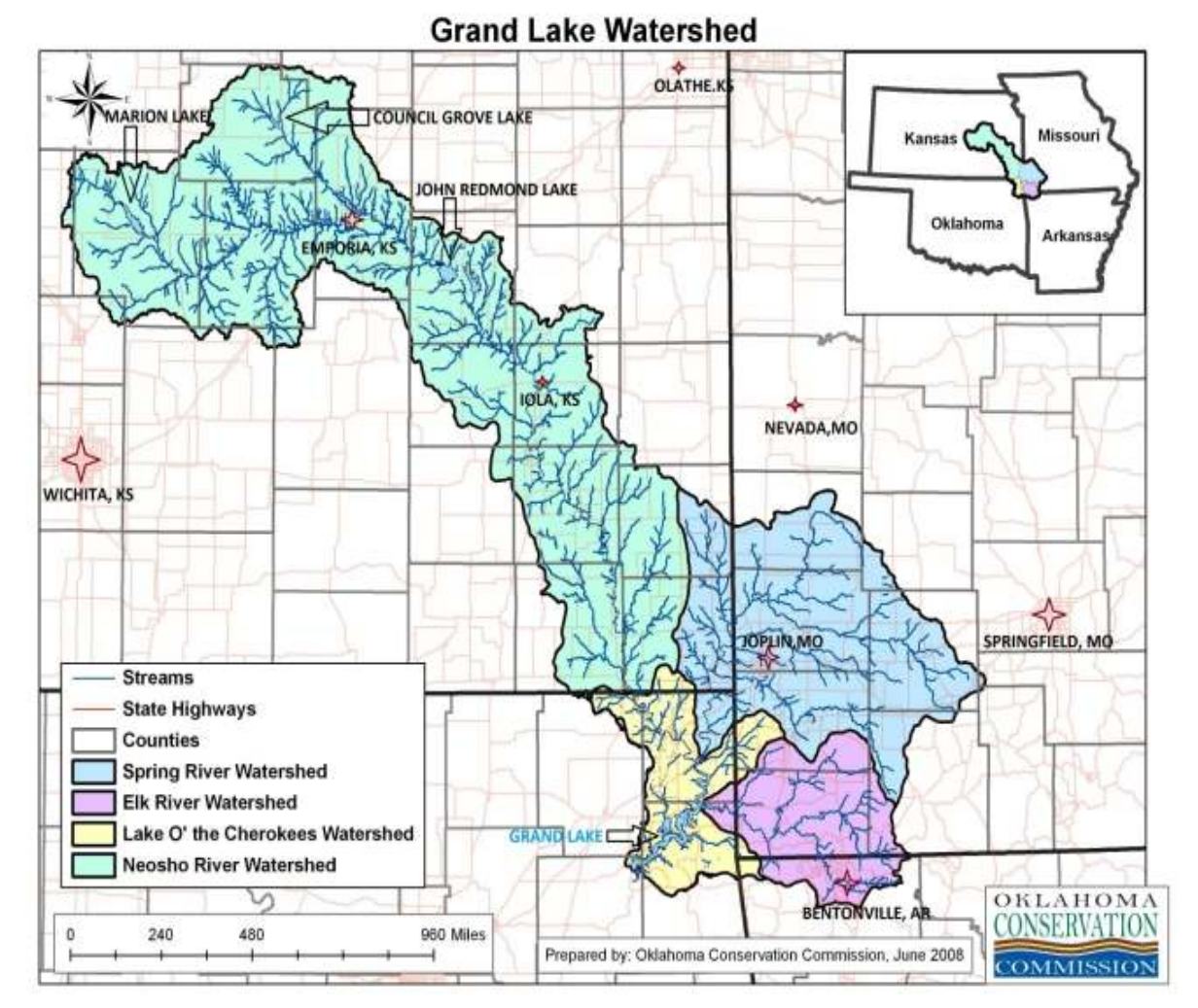
Subwatersheds

Neosho – 57%

Spring River – 25%

Elk River – 10%

Grand Lake – 8%



Grand Lake o' the Cherokees

Economic & recreational treasure in NE Oklahoma.

Problem:

Impaired by low dissolved oxygen (nutrient-related)

Threatened by sediment, heavy metals, & bacteria

Three other major reservoirs in watershed

- Marion
- John Redmond
- Council Grove

All impaired by sediment & nutrients

2005 toxic algae bloom on Marion Lake
(photo courtesy of Gerard A. Clyde, Jr.,
US Army Corps of Engineers, Tulsa District)

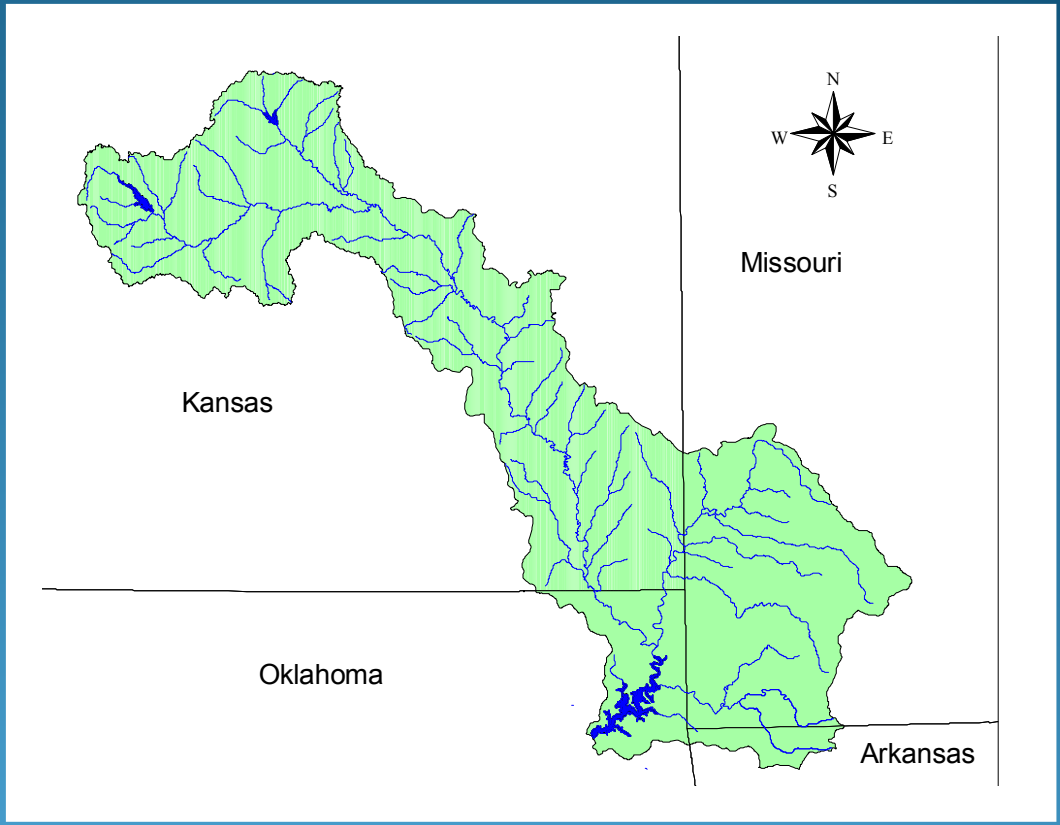
Blue-Green Algae Bloom

Grand Lake, 2011

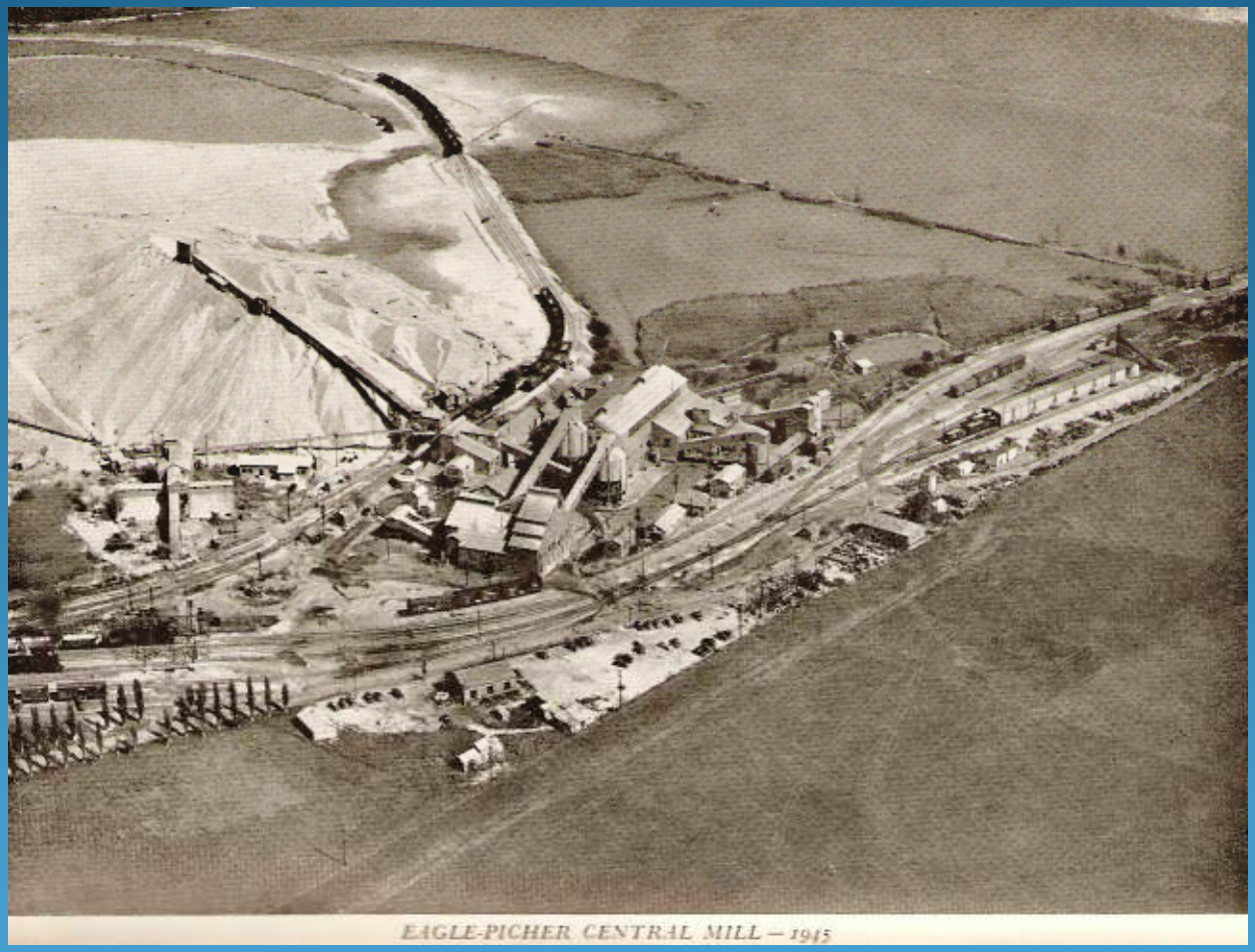
Grand-Neosho Watershed

The solution:

- Relies on efforts in other states as well as in OK.
- Est. 90% phosphorus from other states



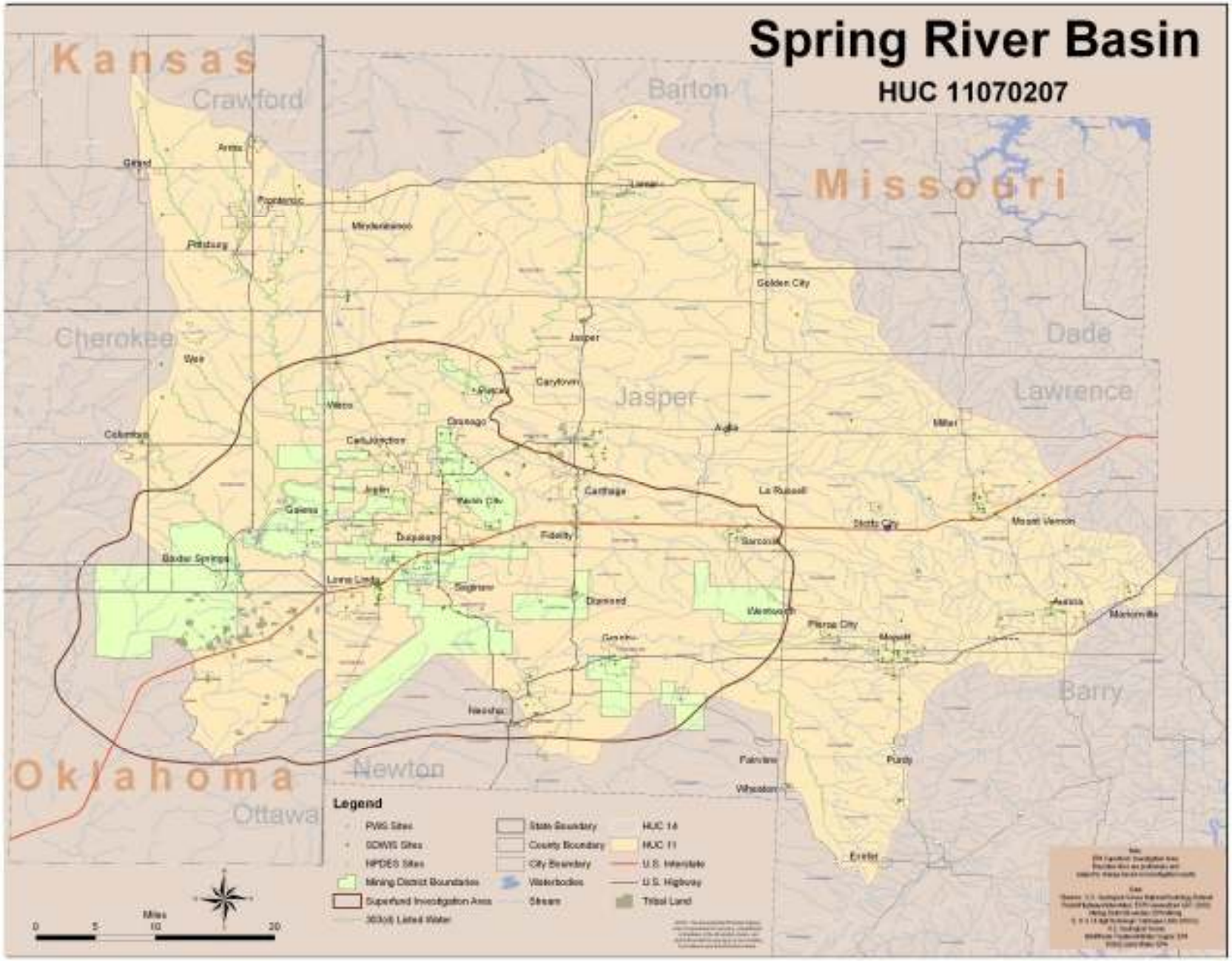
Zinc mining took off in 1870 with development of rail lines to haul coal from the Weir and Pittsburg fields in the north and back haul ore to the lead and zinc smelters there.



Shaner, 1948. Story of Joplin

EPA placed the Cherokee County portion of the Tri-State District on the National Priorities list in 1983. Only about 25% of the 500 million tons of waste remain.

Klahr, 2005. Tri-State Forum


Spring River Basin
HUC 11070207
Kansas
Missouri
Oklahoma
Crawford
Barton
Cherokee
Dade
Lawrence
Jasper
Barry
Newton
Ottawa
Columbus
Golden City
Carthage
Joplin
Webb City
Duquesne
Fidelity
Diamond
Neosho
Legend
PWS Sites
SDWIS Sites
NPDES Sites
Mining District Boundaries
Superfund Investigation Area
303(d) Listed Water
State Boundary
County Boundary
City Boundary
Waterbodies
Stream
HUC 14
HUC 11
U.S. Interstate
U.S. Highway
Tribal Land
Miles
0
5
10
20
EPA
Region 7

Water Shortages Create Conflict

- Old west movies – dam the creek, dry up the squatters
- Six-Day War – Syria tried to divert flow of Jordan River
- Kansas sued Colorado over Arkansas River
- Kansas sued Nebraska over Republican River
- Kansas sued USACE over federal reservoir releases

Missouri Events

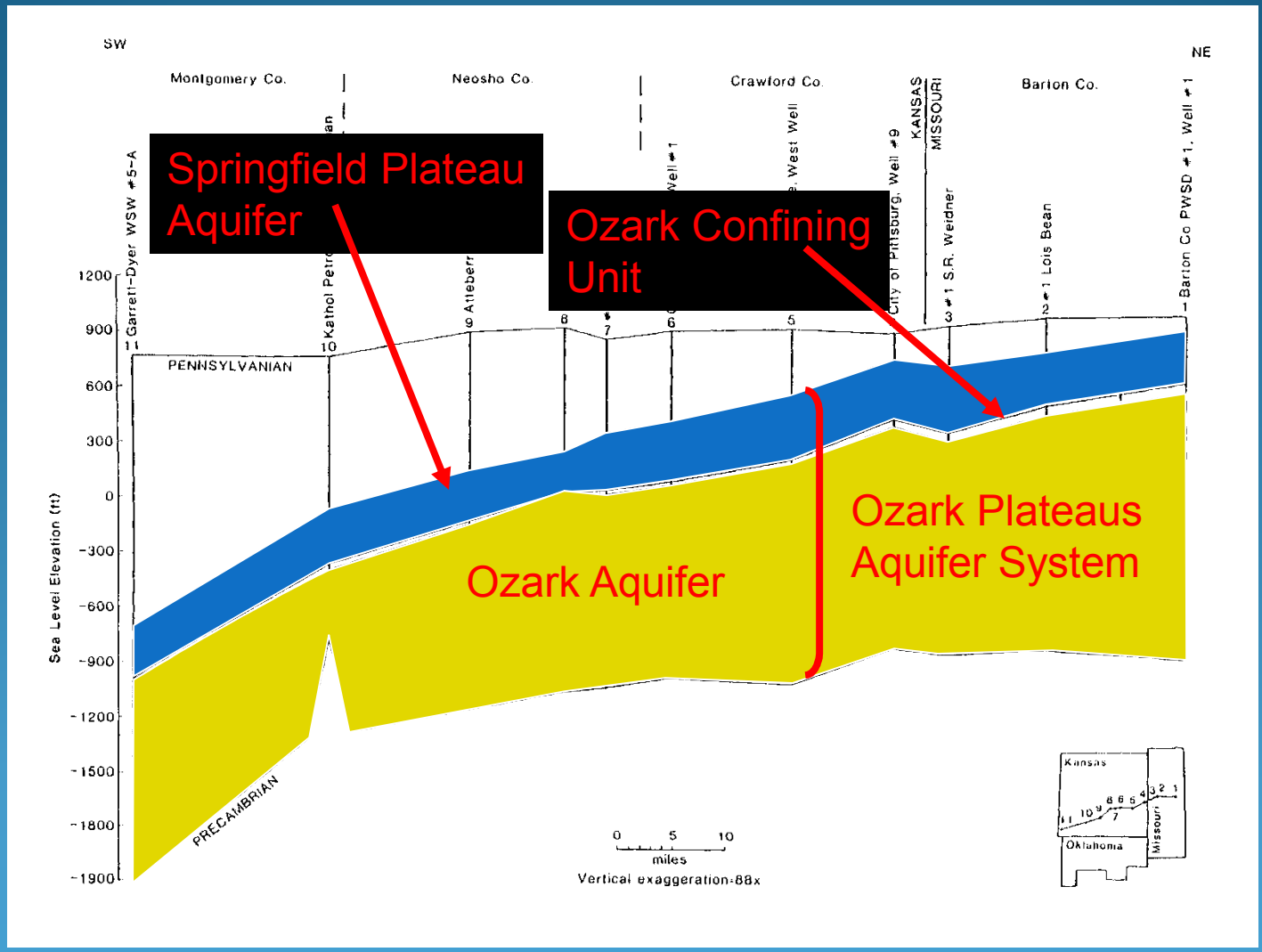
- Periodic articles in the Joplin Globe about summer water shortages and cones of depression around well fields in Joplin, Carl Junction and Webb City.
- 2003 –WHPA completes a mass balance model of Ozark Aquifer for Missouri American, which says at the current rate of development the aquifer will not be able to meet needs during a drought similar to recent one in 10 years

Kansas Events

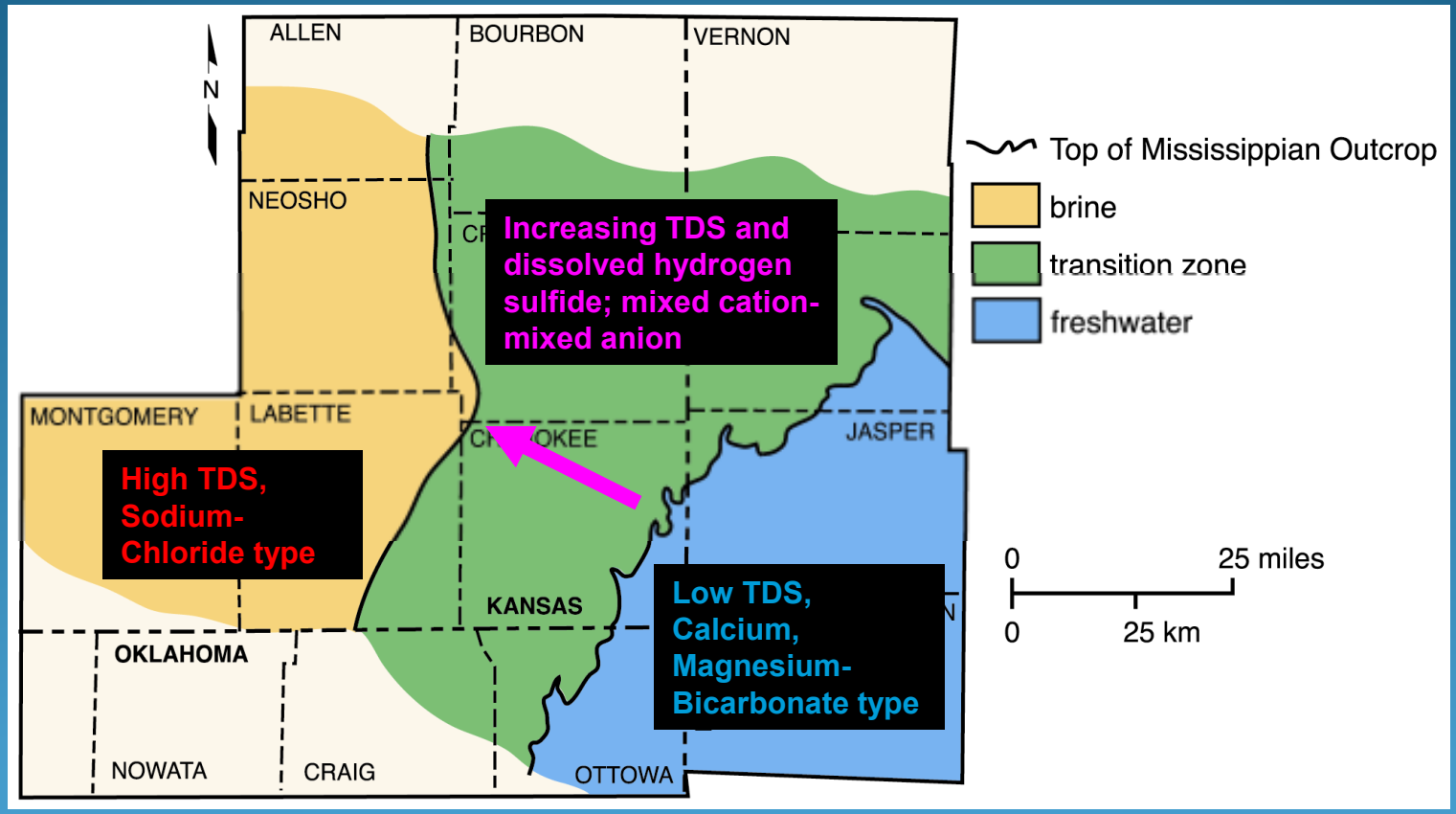
- New Empire District plant comes on line and drops the water levels in Riverton and Galena wells 100' in a year.
- Wholesale 19 loses participants as they plan to drill their own wells.
- 2003 – BAC asks DWR how water rights are allocated. Requests a moratorium until the safe yield for the Ozark could be determined.
- USGS MODFLOW Study – SIR 2009-5148

Regional Aquifer/Confining Units

(Jorgensen et al. 1993)



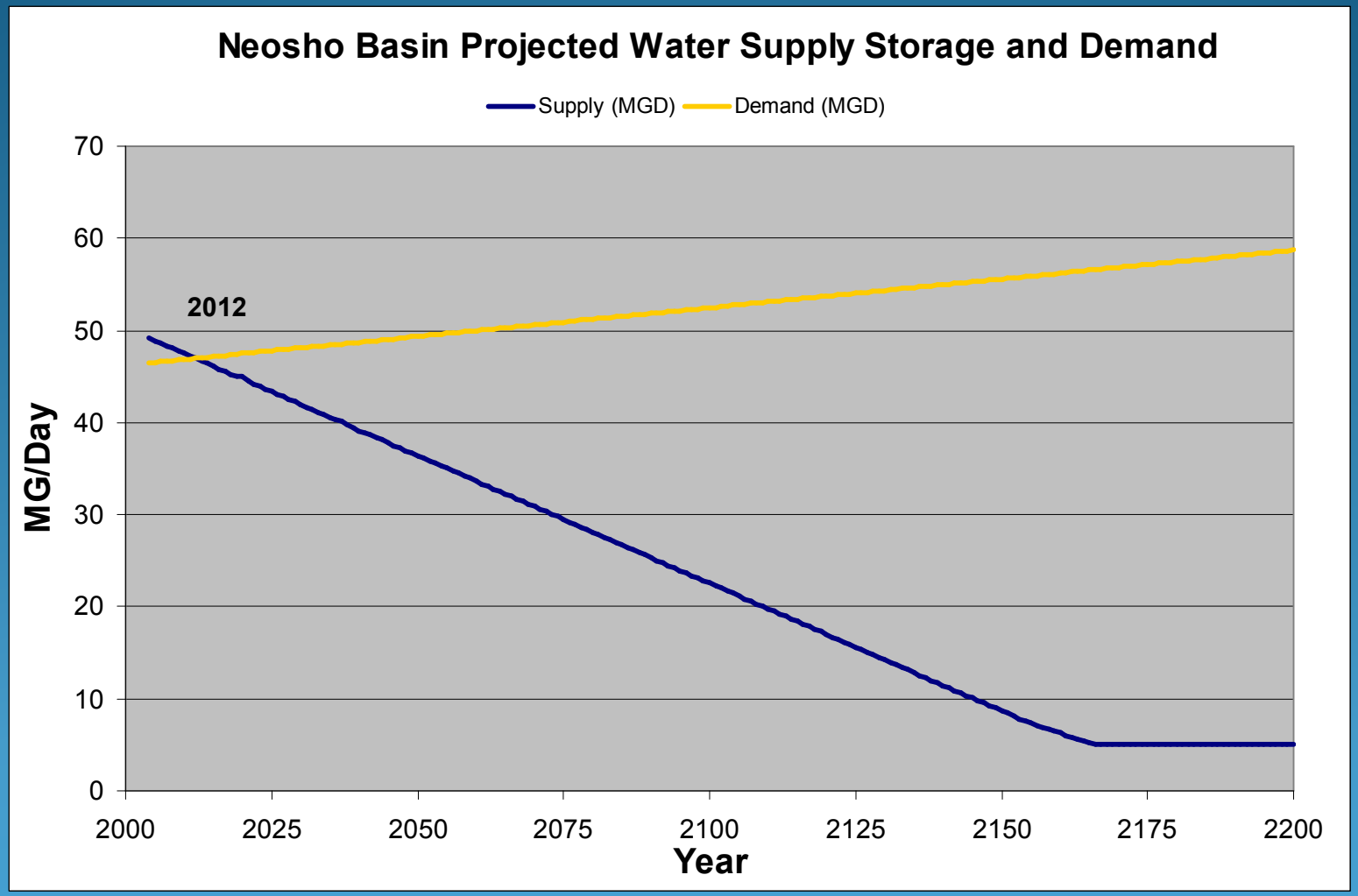
Water Quality in the Ozark Aquifer (circa1980)



Paradigm Shift

- Ogallala story a painful lesson
- Spring River at only 26 stream miles is the 2nd or 3rd largest unallocated water supply in the state of Kansas
- Probably 99% of water supplies are allocated and 95% of those are over appropriated
- Water DEVELOPMENT gives way to RESTORATION, PROTECTION AND MANAGEMENT

Neosho River Corridor Supply-Demand



DOWNSTREAM OF JACOBS LANDING

Neosho Summary

- The river is closed to new year around appropriations
- New water rights are for diversions that can only be made during wet periods
- Would be suitable for ‘off stream storage’

What About Spring River?

- Second or third largest unallocated water supply in the state
- However, most of the watershed is in Missouri
- Water Rights are available, but the stream was administered for Minimum Desirable Streamflows for 5 months in 2006 for the first time
- The City of Pittsburg has applied for a second source right
- Wholesale 19 is developing a water supply above Empire Lake

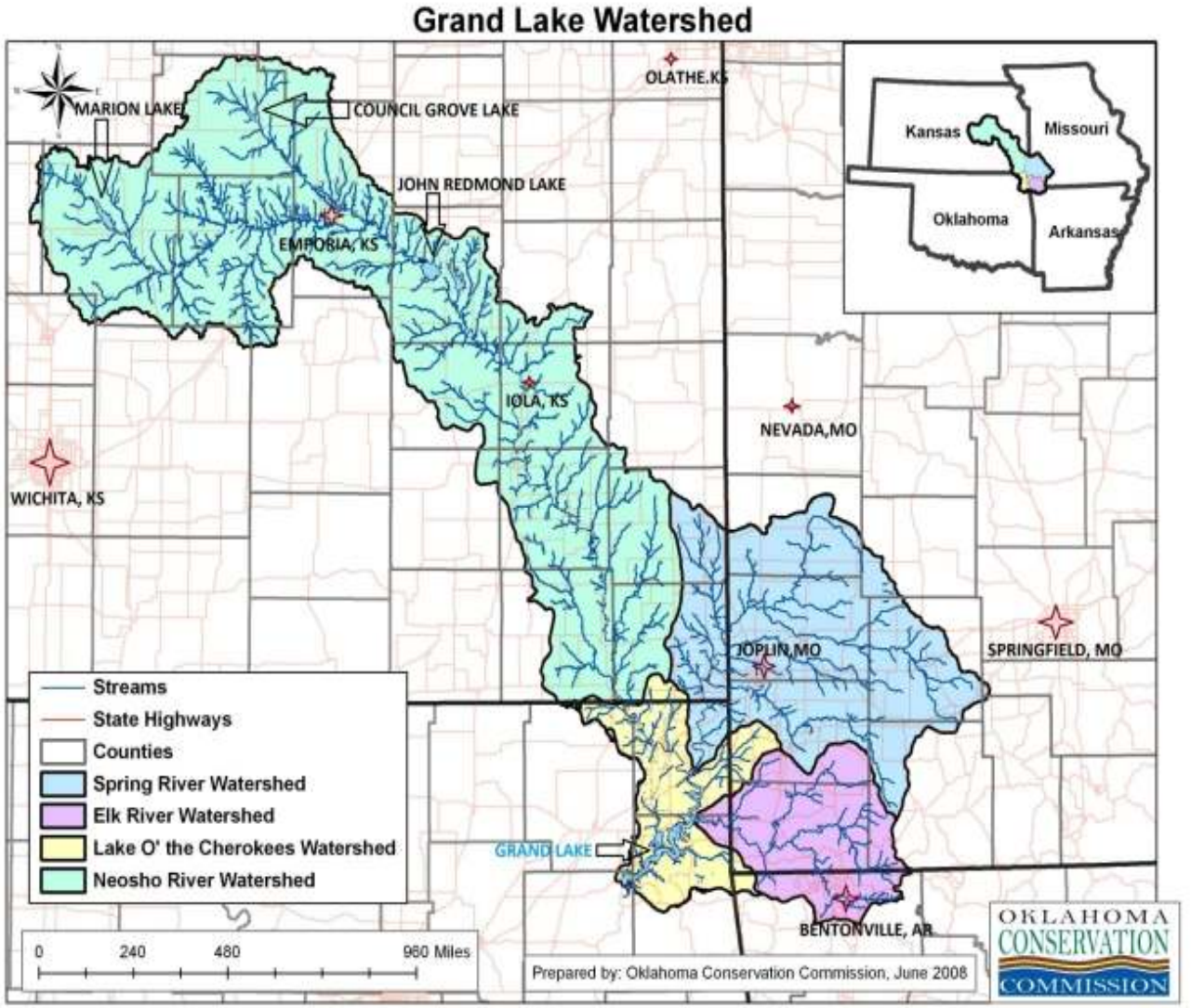
What are the Options?

- Build off stream reservoirs to capture surplus flows in the Neosho and Spring Rivers
- Work with Oklahoma to obtain needed supplies from Grand Lake
- Initiate water conservation strategies that protect existing supplies
- Curtail economic development

Boundary and Location Issues

Shared by 4 States
-Jurisdictional
-Cultural/Legal
- Cooperation
- Marginal/Edge
- Ownership

Political Terrain
-State Conflicts
-Low Tractability
-Low Return



First Grand Lake Watershed Plan (2004)

- Planning: Oklahoma Conservation Commission (OCC) - EPA 319 project
- Implementation: OCC & OSU
- Focused on near-lake environment (Grand Lake)
  - Rain gardens
  - Urban nutrient management
  - Soil profiling
- Promised updated plan with four state input by 2008

Lack of Coordination Across Watershed

Challenges:

- 4 states, 2 EPA regions, 10 tribal nations
- Very large watershed (over 10,000 sq miles)
- Only a few sub-watershed plans completed or developing
- OK Targeted Watershed proposals unfunded – total watershed not included

Grand Lake O' the Cherokees Watershed Alliance Foundation, Inc. (GLWAF)

- Initiated in 2007 by OK citizens, grown to members from all 4 states
- Became an official non-profit 501(c)(3) organization in Fall 2007.

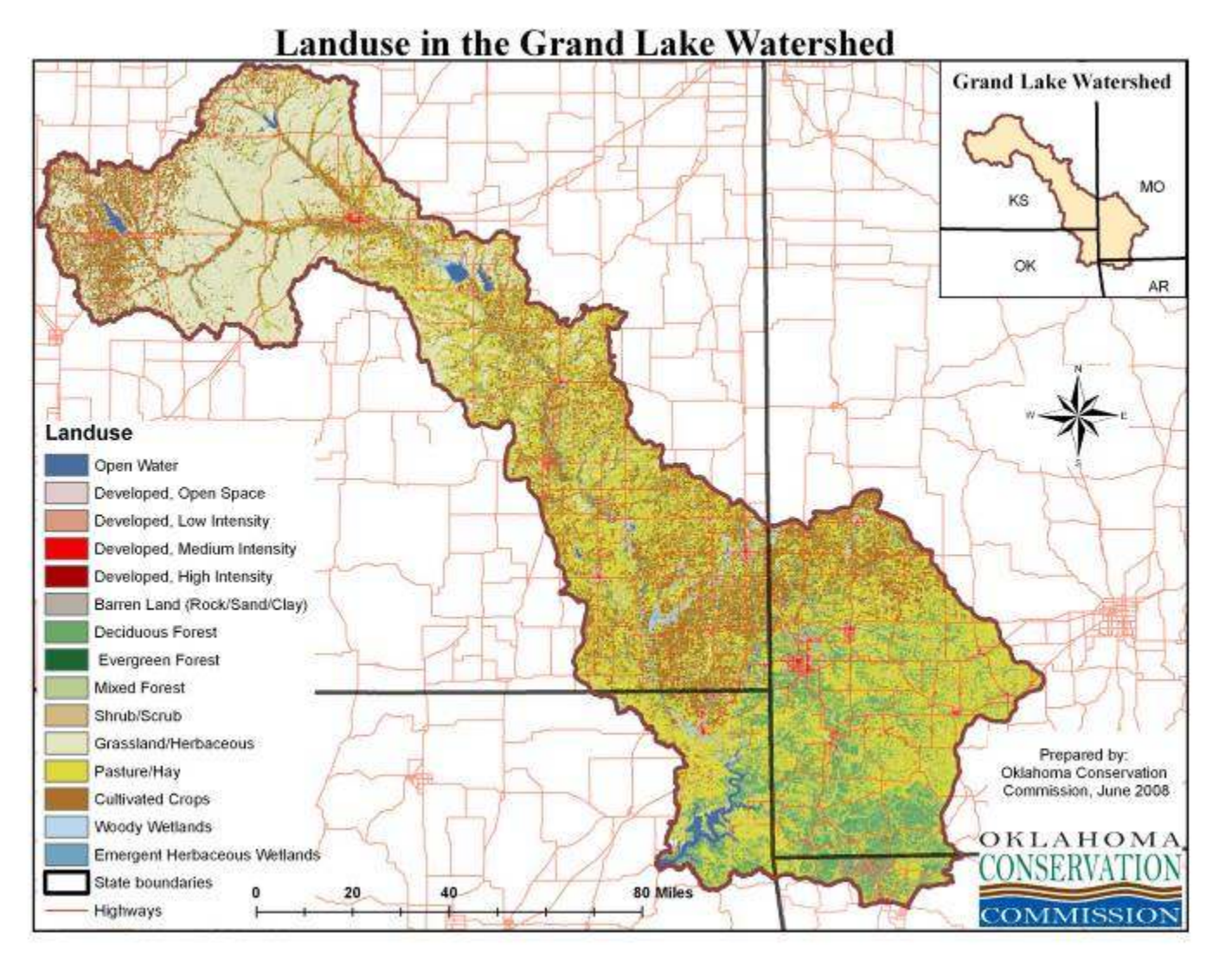
GLWAF Board 2007-2012

Thomas D. Churchwell	Oklahoma
Tom Collinson	Kansas
James Corbridge	Oklahoma
John K. Gillette	Oklahoma
Rick Hines	Kansas
Charles (Larry) Harrelson	Oklahoma
Drew Holt, *Vice-Chair*	Missouri
Darrell Bowman	Arkansas
Rick Littlefield	Oklahoma
Carl Metcalf, *Foundation Chair*	Oklahoma
Robert L. Nichols	Missouri
Roger Norbeck	Arkansas
Pack St. Clair	Kansas
Dr. Darrell Townsend, *GRDA Ex-Officio*	Oklahoma
Dr. James Triplett , *Foundation President*	Kansas

Updated Grand Lake Watershed Plan (2008)

- GLWAF's first major initiative
- Completed by the watershed plan commit
- Members from each watershed state
- Input and support from several state agencies

Characterization of the watershed



Hydrology, Climate, Ecoregions, Landuse, Population, etc.

Assessment: Priority Impairments, Sources, Causes
by 4 major subwatersheds

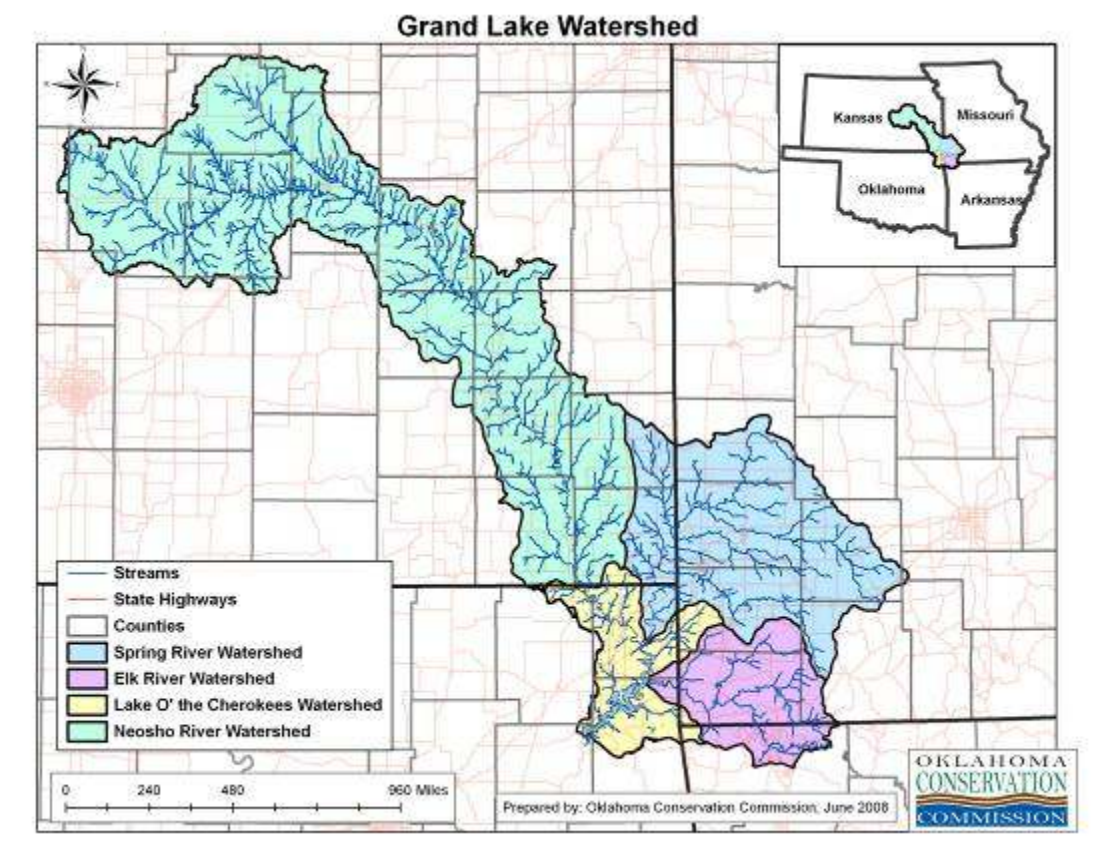
Based on:

- TMDL documents

  + number of impairments
  + priority in TMDL documents

- Subwatershed plans
- Stakeholder input

  Foundation and other watershed groups



Most significant impairments (overall):

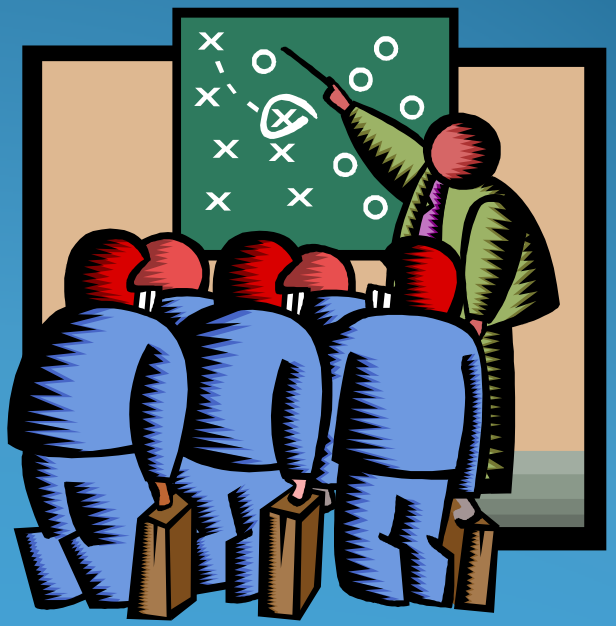
Nutrients, Sediment, Bacteria, Heavy metals

Strategies

Focused on watershed-wide strategies

NOT intended to replace subwatershed plans

Ultimately local solutions needed
→ local determination and buy-in



Top Three Strategies

- Watershed-wide WQ modeling (nutrients & sediment) and streambank stability studies
  1) Aid subwatershed planning (and next GL plan)
  2) Aid in fund-raising and distribution of funds

- Further develop GLWAF to
  1) Foster subwatershed plan development (local level)
  2) Fund-raising (public and private)
  3) Keep attention focused on Grand Lake Watershed
- Watershed-wide signage

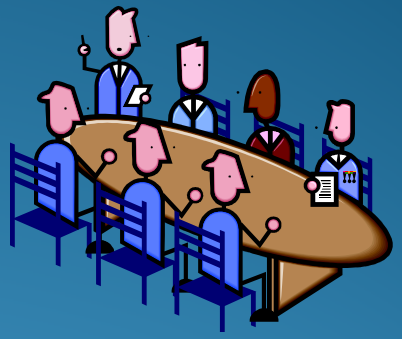
Other Strategies

- Regular meetings of 4 State Water Agencies
- Develop a Health Index for watershed
- Educational videos and factsheets
- Data collection and analysis (gap analysis, etc)
- Annual meeting of watershed groups
- Add monitoring sites

Meetings with State and Federal Agencies

First meeting, January 13, 2009

- Introduction of GLWAF
- Acceptance of plan
- Cooperation Commitment



Second meeting, November 10, 2009

- Funding of top strategies and future plans

Third meeting, August 24, 2010

- Review of the Modeling/Targeting Study

Fourth meeting, November 8, 2011

- Review Study, Promote 4-state MOU

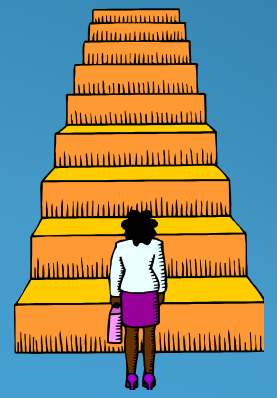
Fifth meeting, November 5, 2012

- Review State's efforts, MOU update

All meetings at Wildcat Glades Audubon Center, Joplin, MO

Future Directions and Challenges

- Funding to support watershed initiatives
  - Private, State and Federal
- Garnering political support – Local, State, Federal
  - Meetings with State and Federal Legislators
  - Request for cabinet-level state agency meetings
- EPA cooperation – Regions 6 & 7
  - Identify process for interregional funding
- GLWAF and Sub-Watersheds to work Together – Member, GLWC



More Information

Strategic Plan, Watershed Plan and more at

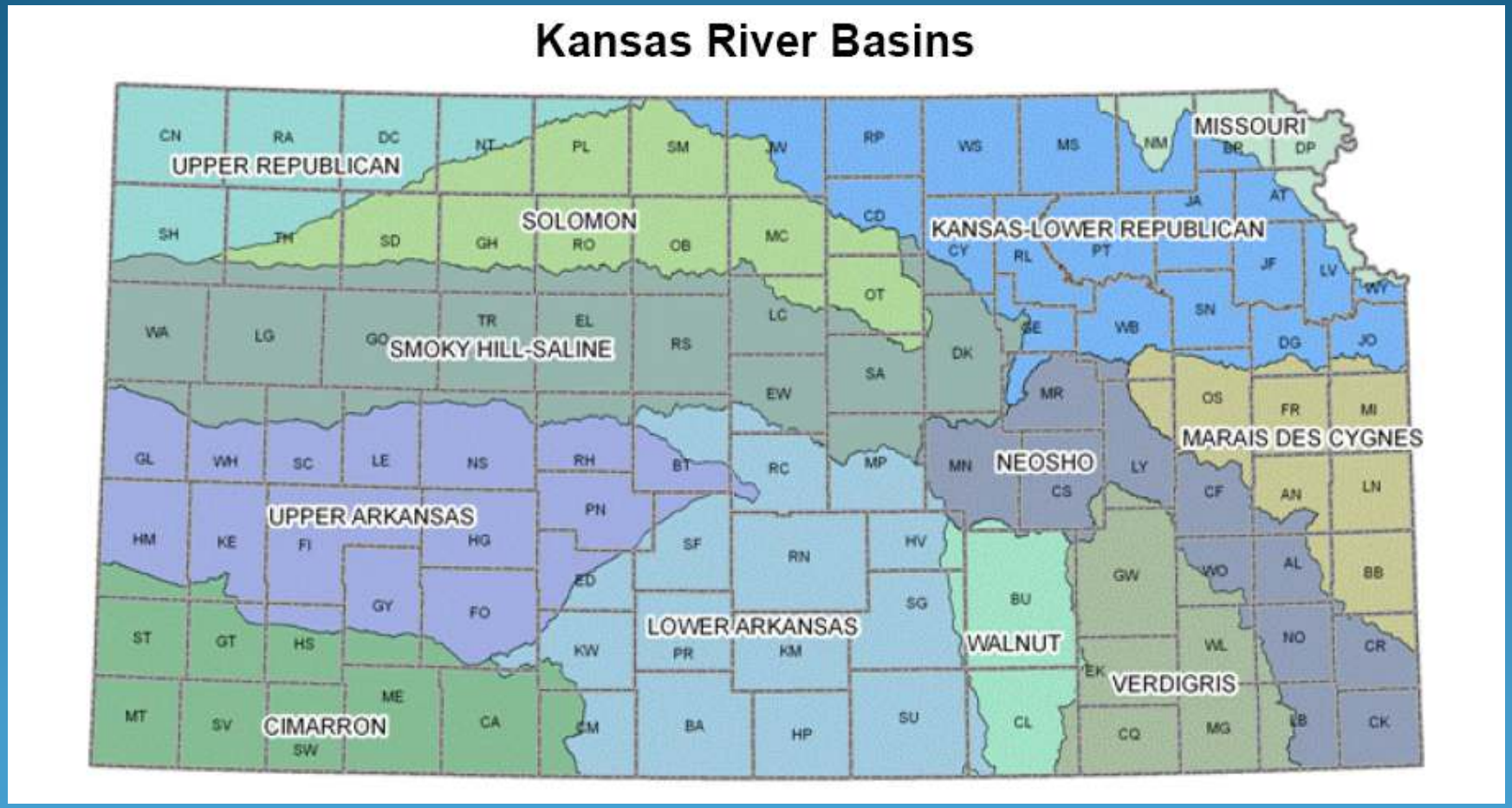
Grand Lake Watershed Alliance Foundation: glwaf.org

Questions?

GLWAF Objectives

- Assisting identification of solutions for water quality related issues
- Providing private funding to supplement governmental funding
- Assisting in the organization and support of citizen-based organizations
- Funding a full time Foundation staff to work within the watershed
- Supporting a strong public education outreach program
- Energizing citizens and watershed stakeholders in shaping the watershed
- Interfacing with local, state, Tribal, and federal agencies

Kansas Water Planning

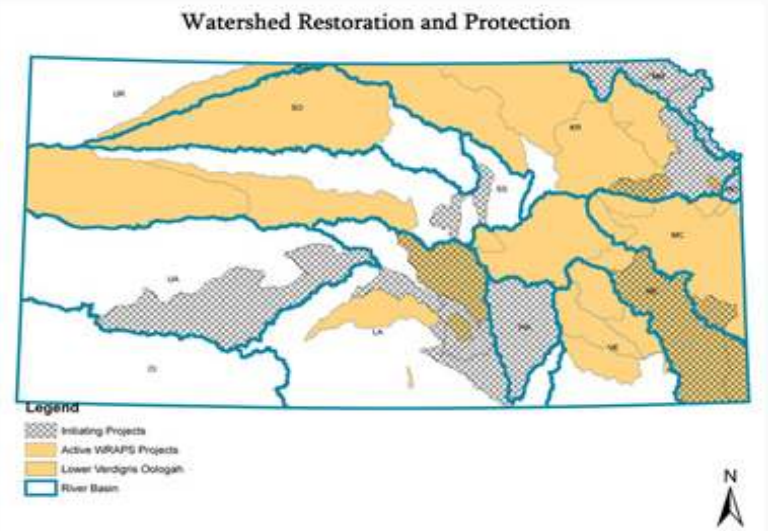


WRAPS Projects Directory

There are currently over 25 active WRAPS projects in Kansas. Only those projects that have entered their information for the online KS WRAPS directory are listed below.

Provide information on a current or initiating WRAPS Project to be listed in this directory by submitting the WRAPS Project Directory Information information form.

Click here to register for an account, allowing you to create your WRAPS Project directory listing.

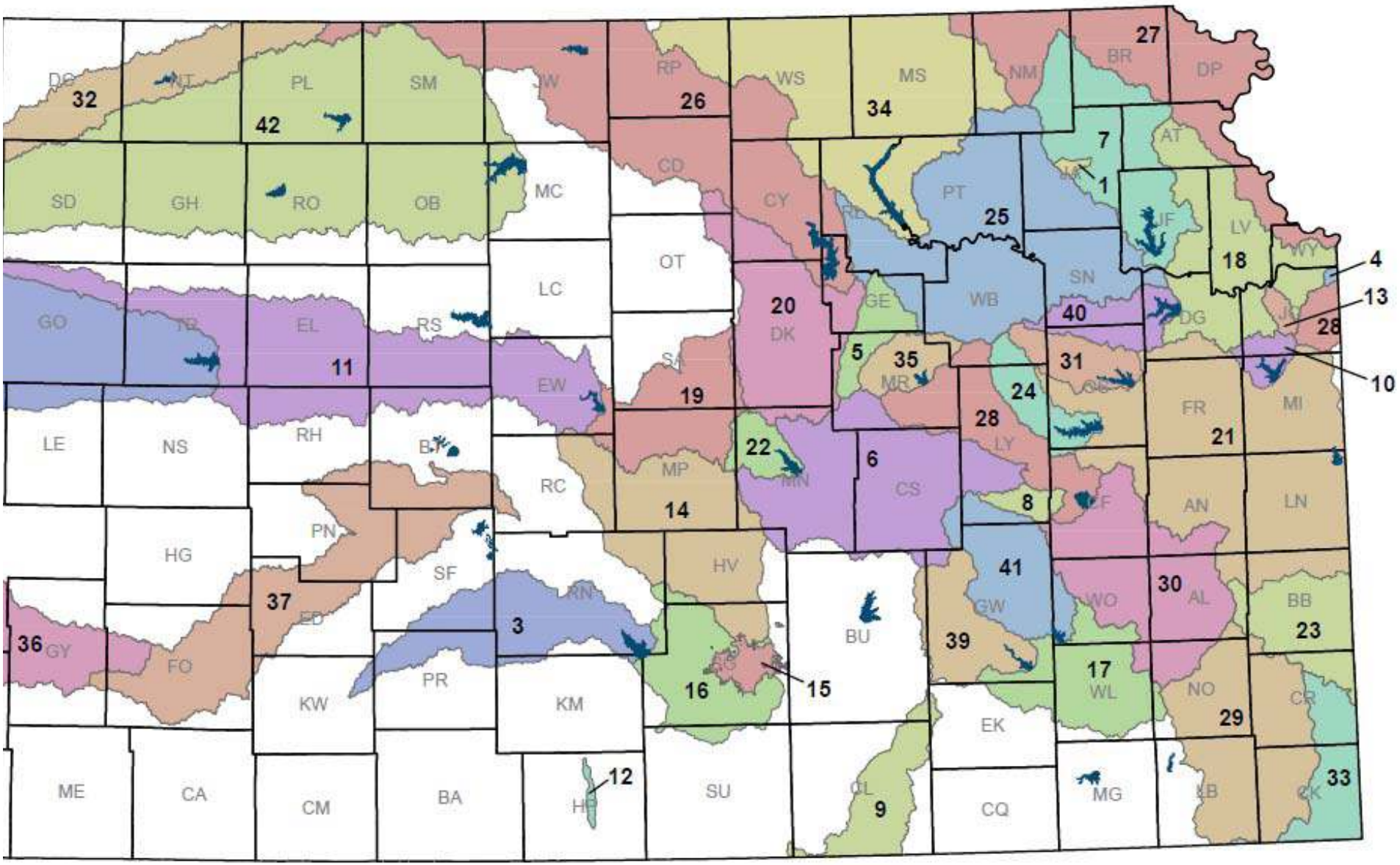


- Big Creek Middle Smoky Hill River Kanopolis Lake Watershed
- Cheney Lake Water Quality Project
- Clarks Creek Water Quality Project
- Delaware River WRAPS
- Grouse-Silver Creek Watershed
- Hillsdale Water Quality Project, Hillsdale Watershed
- John Redmond Lake-Neosho River WRAPS Development-Eagle Creek WRAPS Implementation
- KS-WRAPS Upper Wakarusa WRAPS Implementation (Six Mile and Lynn Creeks)
- Little Arkansas River Watershed
- Marmaton WRAPS
- Melvern Lake Watershed
- Middle Kansas WRAPS
- Oolagah Lake/Lower Verdigris Channel & Riparean Area Assesement
- Solomon River Waconda Reservoir Watershed
- Spring River Watershed Development
- Twin Lakes WRAPS
- Upper Timber Creek
- Upper Wakarusa Watershed
- Upper Wakarusa Watershed WRAPS

This project funded in part through the Kansas Water Office, with appropriations from the Kansas Water Plan Fund; and the Kansas Department of Health and Environment, through EPA Section 319 Nonpoint Source Pollution Control Grant # C9007405-11.

Kansas WRAPS Projects

Stakeholder Leadership Team Areas
as of September 2009



No Czars – A Diffusion of Power

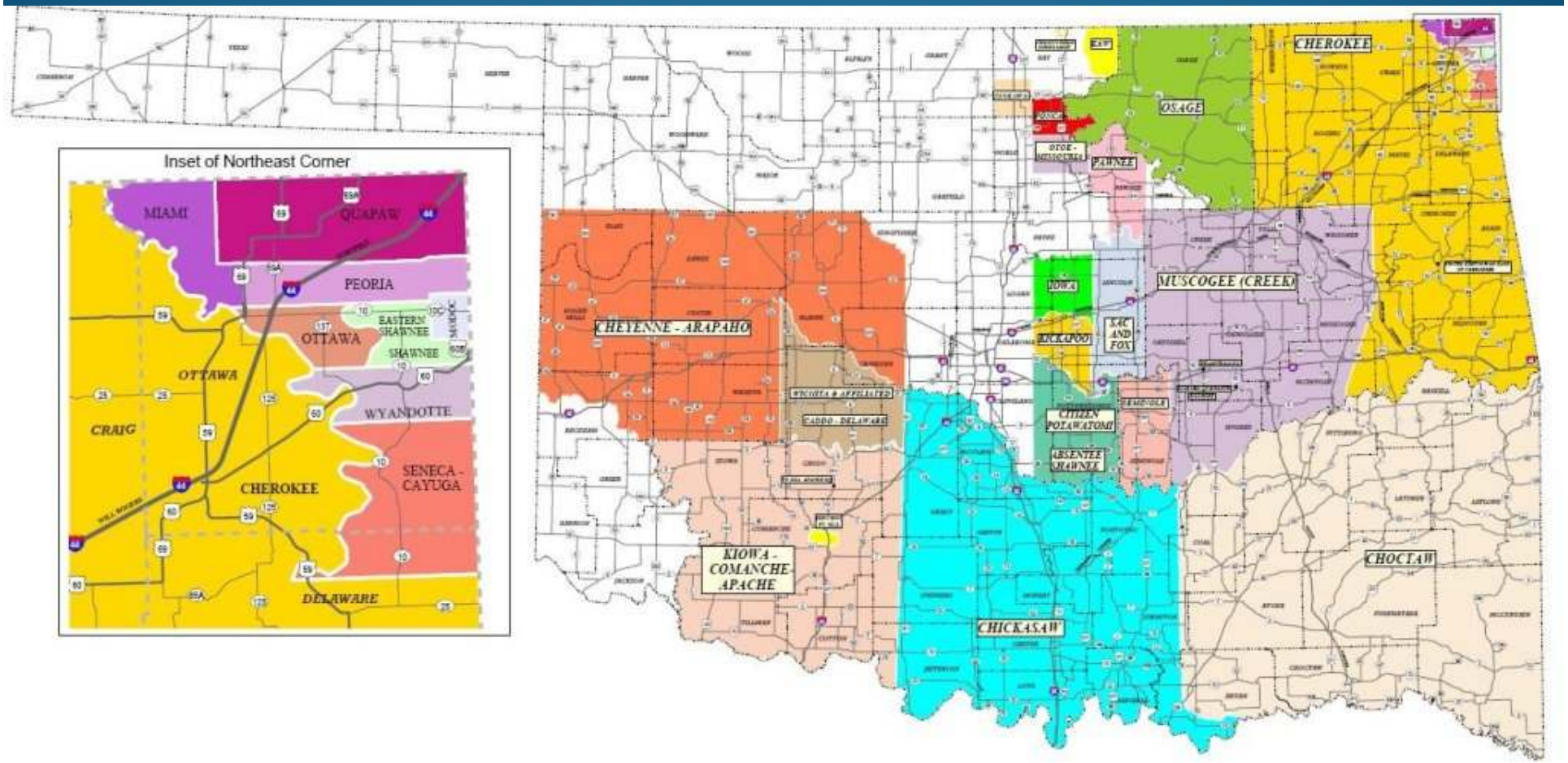
- Current water planning process the result of conflict over inter-basin transfers: Kansas River Basin to Arkansas River Basin
- Legislative action in 1983 created the Kansas Water Office (administrative, technical and planning) and the Kansas Water Authority (policy/fund.)
- All planning, no funding until 1990 - Roughly $16 Million was allocated to Manage, Protect and Restore water resources

1945 Water Appropriation Act

- 1944 – KS Supreme Court rules DWR has no legal authority to regulate water – Legislature?
- Replaced the Common Law of riparian rights.
- Took effect June 28, 1945 with DWR responsible.
- Vested Rights – Previous users that were active at time the law took affect are most senior.
- Followed principle – "First in time, first in right".
- Junior rights are shut off during water shortages.

Peck, John 1992 ; Griggs, Burke 2010

TRIBAL JURISDICTIONS IN OKLAHOMA



37 FEDERALLY RECOGNIZED TRIBES (Tribal Boundaries provided by the Bureau of Land Management)

OKLAHOMA DEPARTMENT OF TRANSPORTATION
PLANNING & RESEARCH DIVISION
OFFICE OF MANAGEMENT & ENTERPRISE SERVICES
200 N.E. 21ST STREET
OKLAHOMA CITY, OKLAHOMA 73105

JUNE 1, 20
G:\TRIBAL_JURISDICTIONS.ai

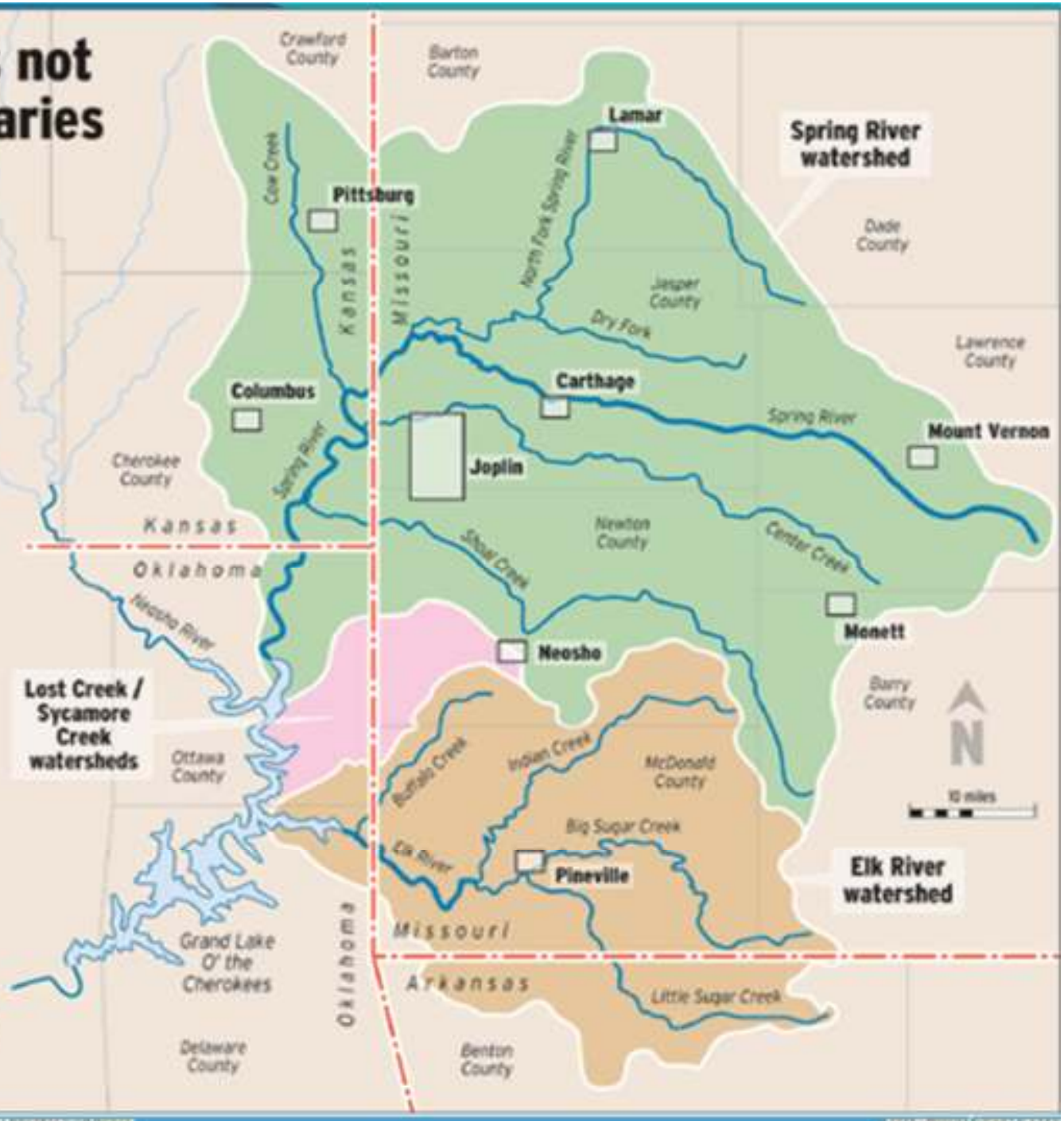
Flow of water does not follow state boundaries

Water quality in Grand Lake O' the Cherokees and points downstream in Oklahoma have officials in that state focusing attention on the Spring River and Elk River watersheds in Missouri and Arkansas. The concern is over the amount of phosphorus being introduced from farming operations in the two watersheds, as well as heavy metals from old mining operations in the Spring River basin.

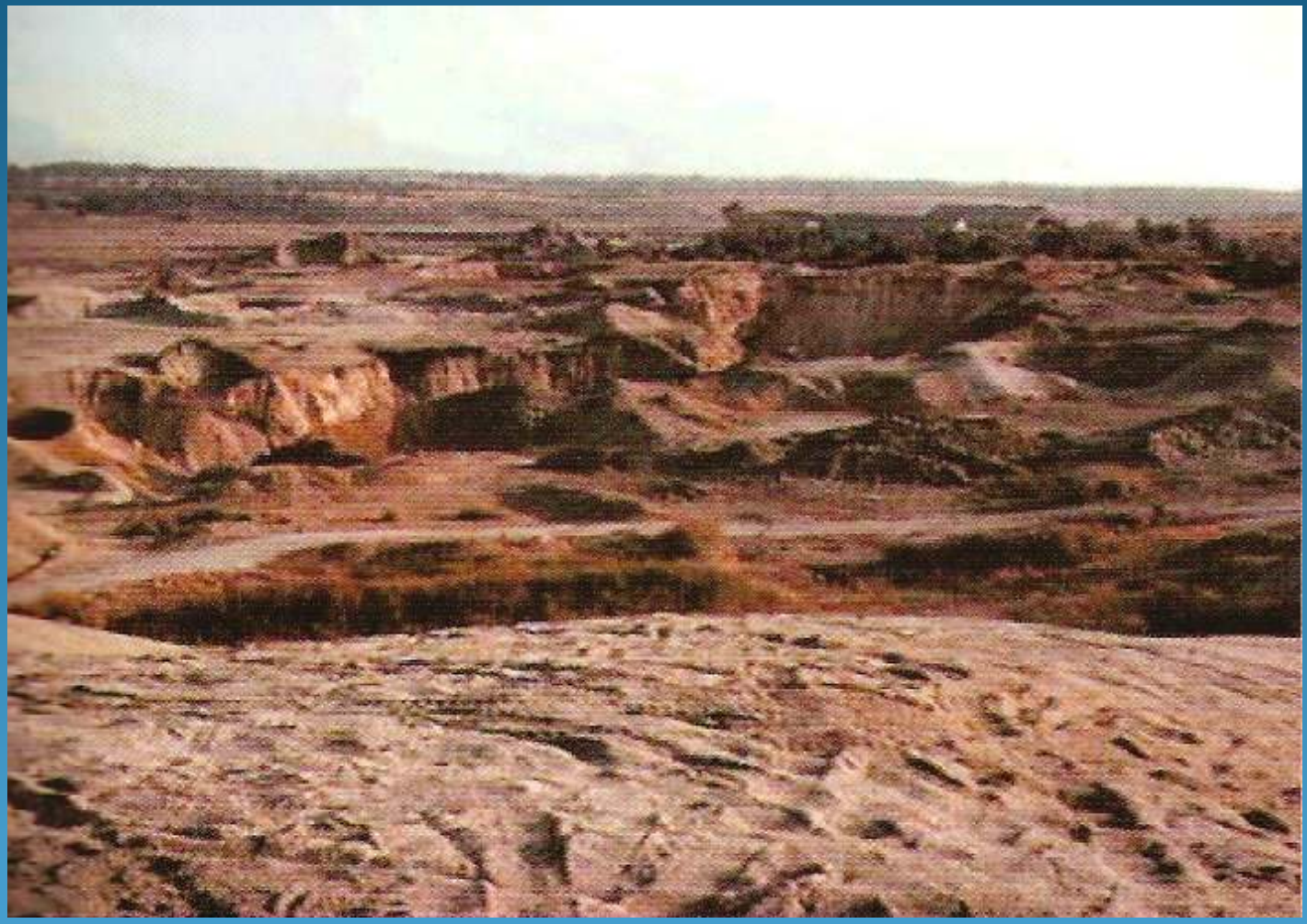
Spring River watershed
Spans 10 counties in Missouri, Kansas and Oklahoma.

Elk River watershed
Spans 6 counties in Missouri, Arkansas and Oklahoma.

Grand Lake O' the Cherokees
Grand Lake has 1,300 miles of shoreline surrounding 43,500 acres of surface area. Impounded in 1940 upon completion of Pensecola Dam, the longest multiple-arch dam in the world at 5,145 feet.



Many scars remained in the region, such as the area known as“Hell’s Half Acre” on the north edge of Galena, KS



Pope, 2005. USGS SIR 2005-5251

Acid mine drainage from abandoned shafts and old air holes contaminate area streams.

Kansas Geological Survey, File Photo

Local Pre-development Ground-water Flow Pattern Ozark Aquifer